BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
2000 Biennial Regulatory Review	)	
Spectrum Aggregation Limits for	)	**WT Docket No. 01-14**
Commercial Mobile Radio Services	)	
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	)	

COMMENTS OF LEAP WIRELESS INTERNATIONAL, INC.

LEAP WIRELESS INTERNATIONAL, INC.

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Leap Wireless International, Inc., on behalf of itself and its affiliated entities ("collectively, "Leap"), hereby offers these comments in connection with the above-captioned Notice of Proposed Rulemaking.[1] Leap is an entrepreneurial PCS carrier that now offers its innovative and highly competitive Cricket service plan in 18 markets around the United States, and that is aggressively seeking opportunities to expand into other markets. As an innovative carrier seeking to grow, Leap is uniquely situated to comment on the ability of incumbent carriers to foreclose further market entry – and the ramifications such action would have on consumers. Leap believes that without the spectrum cap these carriers could, and would, foreclose Leap's entry into local CMRS markets. The Commission should not allow this to happen. It should not raise or remove the spectrum cap.

[1] 2000 Biennial Regulatory Review, Spectrum Aggregation Limits for Commercial Mobile Radio Services, *Notice of Proposed Rulemaking*, WT Dkt. No. 01-14 (rel. Jan. 23, 2001) ("*Notice*") ¶¶ 11-12.

I. INTRODUCTION AND SUMMARY

The CMRS spectrum cap[2] was adopted five years ago as a "minimally intrusive" way to "avoid excessive concentration of licenses and promote and preserve competition," while at the same time "maintaining incentives for innovation and efficiency."[3] Unpopular from the start among those whose behavior it was intended to restrict, the spectrum cap has recently come under a more or less full-scale assault. Yet the basic rationale for the spectrum cap remains unchanged, and no developments in the five years since its adoption have intervened to obviate the need for its retention.

In these Comments, Leap demonstrates that competition in the CMRS marketplace has *not* developed to a level that would justify elimination of the spectrum cap. While the CMRS marketplace may be *more* competitive than it once was, it still is not as competitive as it could (and should) be.

Furthermore, Dr. Peter Cramton, professor of economics at the University of Maryland and a widely published consulting expert on spectrum auctions and spectrum management, demonstrates that the spectrum cap has led to significant public interest benefits.[4] Dr. Cramton shows seven[5] distinct benefits of the spectrum cap. He describes Leap as the "poster child" for the spectrum cap because Leap illustrates two of the most important benefits of the spectrum cap's preservation of opportunity for new corners to acquire spectrum in CMRS markets: better prices and better service. Specifically, Dr. Cramton shows that:

- Leap's entry into a market drives down prices – by an average of *37 percent*.

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[2] 47 C.F.R. § 20.6(a).

[3] Amendment of Parts 20 and 24 of the Commission's Rules – Broadband PCS Competitive Bidding and the Commercial Mobil Radio Service Spectrum Cap, *Report and Order*, 11 FCC Rcd 7824, ¶¶ 94-95 (1996).

[4] *See generally*, Declaration of Peter Cramton (filed April 13, 2001), attached as Exhibit 1 hereto ("Cramton Dec.").

- Leap provides consumers with a service (essentially, landline replacement) that itself is a benefit to society.

Leaving aside what he calls the "Leap effect," meaning entry by a *non-traditional* carrier, Dr. Cramton also shows that the spectrum cap also benefits the public by facilitating entry among *traditional* carriers. Again, this leads to lower prices and better service overall. Likewise, as Dr. Cramton points out, the spectrum cap forces carriers to use their spectrum more efficiently than they probably would otherwise. These and other public interest benefits, Dr. Cramton concludes, far outweigh the purported benefits of removing the cap that are proffered by the cap's opponents.

Leap also debunks the large carriers' claims that they "need" more spectrum. To be sure, they would *prefer* to have more spectrum, but no carrier could possibly *need* more than 45 MHz. Mark Kelley, Chief Technical Office of Leap, demonstrates that the spectrum cap's most vocal opponents use their spectrum with appalling inefficiency.[6] He shows that if they used the same sort of efficient equipment that Leap uses,

- TDMA carriers could *triple* their network capacity,
- GSM carriers could increase their network capacity *seven-fold*, and
- analog carriers could increase their capacity by *more than 24 times*.

Based on his analysis, Kelley concludes that it's not the amount of spectrum that matters for wireless carriers but how it is used.

In fact, no carrier should claim that it is "capacity constrained" while it still retains *any* analog subscribers: For example AT&T, which carries approximately 30 percent analog subscribership, could *double* its system capacity just by upgrading its analog component

[5] Cramton Dec. ¶¶ 10-12

[6] *See generally*, Declaration of Mark Kelley (filed April 13, 2001), attached as Exhibit B hereto ("Kelley Dec.").

to the most efficient technology now in common use.[7] 45 MHz is an enormous amount of spectrum, when used efficiently.

Nor can anyone reasonably claim that the spectrum cap should be lifted in order to implement "3G" services. As Mark Kelley demonstrates, wireless data services should require relatively little bandwidth, in most cases far *less* than voice telephony. And to the extent that 3G equipment may create a demand for additional capacity, it will also furnish added supply: we can expect 3G equipment at the very least to double the spectral efficiency of existing equipment. Moreover, even if 3G does require more spectrum, there is no reason that incumbent voice operators (rather than upstart data providers) should get it. The incumbents' vaguely articulated notion that "3G" will require more spectrum simply cannot justify a policy reversal.

In any case, the Commission's waiver policy is an eminently reasonable accommodation for any carrier that is actually capacity constrained. The Commission has offered that a carrier (1) demonstrating actual need, and (2) showing that no anticompetitive effect will result from a proposed combination, may obtain a waiver of the cap. But to date, no carrier has accepted that offer.[8]

The inefficient choices of the large supercarriers have caused them to ask the Commission for wholesale permission to avoid the consequences of their inefficiencies. The spectrum cap policy designed to "preserve competition," and induce "innovation and efficiency,"

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[7] And as shown, *infra*, AT&T could *triple* its capacity if it upgraded its entire network.

[8] As discussed, *infra*, carriers filed three waivers seeking blanket, permanent insulation from the cap, based on no showing of particularized circumstances.

they will argue, should now be abolished.[9] These entrenched monoliths will ask the Commission to foreclose competition, to stifle innovation and to maintain grossly inefficient networks.

The Commission should refuse these requests.

II. THE PRESENT STATE OF COMPETITION DOES NOT OBVIATE THE NEED FOR THE CAP

The Communications Act requires the Commission to review its rules every two years, and to "repeal or modify" regulations that are determined to be "no longer necessary in the public interest as the result of meaningful economic competition between providers."[10] The Commission has appropriately sought comment, then, on whether "meaningful economic competition" now exists among CMRS providers, and if so whether such competition renders the CMRS spectrum cap "no longer necessary."

While the CMRS marketplace is more competitive than in years past, it still does not protect consumers from anticompetitive conduct. Even in a circumstance where a customer is areas served by multiple carriers, these carriers have in large part behaved in classic oligopolistic fashion: offering largely identical products, and generally avoiding outright competition on price. Moreover, genuinely competitive markets are disciplined by *de novo* market entry. But in the CMRS marketplace, only firms already holding FCC licenses can provide such discipline.

In this imperfect competitive environment, the spectrum cap has served to promote competition by making spectrum more available to new entrants than it otherwise would be. And the cap thereby has helped to promote a range of societal benefits. These benefits, and

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[9] Amendment of Parts 20 and 24 of the Commission's Rules – Broadband PCS Competitive Bidding and the Commercial Mobil Radio Service Spectrum Cap, *Report and Order*, 11 FCC Rcd 7824, ¶¶ 94-95 (1996).

[10] 47 U.S.C. § 161.

perhaps more importantly the promise of similar benefits in the future, would be severely compromised if the spectrum cap was removed.

A. The CMRS Marketplace Lacks Meaningful Competition

The *Notice* and the Commission's *Fifth Report*[11] cite examples of increased competition among wireless operators. Yet, while the CMRS marketplace is *more* competitive than it has been in the past, it remains far from optimally competitive in any absolute sense.

On its face the Commission's data show that nearly a third (31 percent) of the U.S. population has access to four or fewer carriers.[12] As the Commission has recognized, economists have found that "the probability of cartel behavior is 100 percent for up to four competitors."[13] With a third of the US population living with the prospect of anticompetitive behavior among wireless providers,[14] this is hardly a victory for competition. The statistics go on. Only about half of all CMRS subscribers receive modern digital service.[15] The entrenched cellular duopolists retain 75 percent of the entire CMRS market.[16] Nationally, wireless penetration is roughly 32 percent: wireless providers have established prices and service options that fail to appeal to 68 percent of Americans.

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[11] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Conditions With Respect to Commercial Mobile Services, *Fifth Report*, FCC 00-289 (rel. Aug. 18, 2000) ("*Fifth Report*").

[12] *Fifth Report* at 18. This pleading will generally use the term "carriers" to mean CMRS carriers interconnected with the switched telephone network.

[13] 1998 Biennial Review ¶ 30 (*citing* Richard Selten, "A Simple Model of Imperfect Competition, Where 4 Are Few and 6 are Many," International Journal of Game Theory (1973) at 141-201). Interestingly, under the present spectrum cap, a situation could arise where only four carriers competed in a market, thus (by this analysis) ensuring cartel behavior. This might even suggest that the cap be *lowered*, not raised.

[14] As discussed below, the proportion of the nation served by four or fewer is actually substantially more than a third.

[15] *Id.* at 13.

[16] *Notice* ¶ 14.

Moreover, these data significantly *overstate* the level of actual competition. For example, The *Fifth Report* estimates that "69 percent of the U.S. population live in areas with five or more mobile telephone operators."[17] But the report admits that it overstates coverage by determining coverage on a county-by-county basis, so that coverage of *any* portion of a county leads all of its residents to be considered "covered."[18] Thus, for example, the FCC would count VoiceStream as covering all 31,102 residents of Jasper County, Texas, though in fact it covers only five percent of them, 1,406.[19] In VoiceStream's case, the FCC's counting method appears to overstate its overall coverage by about ten percent.[20] And this method overstates *competitive overlap* even more: Though the FCC's methodology presumes that they do, multiple carriers each covering a portion of a county would seldom cover exactly the *same portion*. It appears impossible with current data to determine the extent to which the competitive overlap is overstated, but it is certainly significant.

The fact remains that the dominant wireless carriers behave just as one would expect in oligopoly markets: They offer largely identical services, at prices far above their marginal costs. The attached declaration of Professor Peter Cramton quantifies and discusses the extent to which the incremental addition of carriers provides tangible benefits to the competitive CMRS landscape. As Dr. Cramton shows, the entry by additional carriers continues to produce

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[17] *Fifth Report* at 18.

[18] *Id.*

[19] *See* VoiceStream PCS I License, LLC, *et al.* Demonstration of Satisfaction of the Five-Year Construction Requirement, FCC File Nos. 00056-CW-L-95, *et al.* (Filed June, 2000) (the "*VoiceStream Buildout Filings*").

[20] To obtain this estimate, a researcher analyzed the county-by-county five-year buildout filings of VoiceStream for the Kansas City, Columbus, Minneapolis, Houston, Portland, Oklahoma City, Denver, Salt Lake City, El Paso, and Pittsburgh MTAs. *See, generally, VoiceStream Buildout Filings.* These filings were made as of June, 2000, so they correspond to the date of the FCC's *Fifth Report* data fairly closely. VoiceStream was chosen for this example because it was the only major carrier to have included county-by-county data in its filing. The total population in those MTAs was 33,835,074. VoiceStream reported that it covered 23,339,511. Using the FCC's county-by-county counting method, it would have found that VoiceStream covered 25,936,741.

tangible benefits, while the subtraction of carriers (through reconsolidation) would produce tangible harms. In fact, as Dr. Cramton shows, the elimination of a single competitor would allow the others profitably to sustain a price increase. This cannot constitute "meaningful competition" of a sort that renders continued regulation superfluous.

The CMRS spectrum cap remains a vital tool to prevent a few very large providers from cornering the market for a scarce spectrum resource. The state of competition in the CMRS marketplace does not obviate its need.

B. The Spectrum Cap Produces Significant Public Benefits.

The CMRS spectrum cap has enabled the entry of new and in many cases highly innovative carriers into the CMRS marketplace, and has thereby produced significant benefits to the public. Leap itself is one such carrier.

As Dr. Cramton observes, "Leap is the poster child illustrating the clear benefits of the spectrum cap."[21] He demonstrates that the entry of "non-traditional" carriers such as Leap into a market serves a particularly valuable competitive purpose. That is, entry by carriers like Leap adds more to consumer welfare than does entry by carriers with service offerings substantially identical to the incumbents'. Leap competes directly with the landline provider in a local market (which is, by virtue of its cellular ownership, invariably also one of the "traditional" wireless carriers), and appeals to a market segment that has been largely overlooked by the incumbents. Therefore, society benefits as previously underserved consumers find that their needs and desires are catered to. And society also benefits further when the incumbents are forced into a competitive response.[22] For example, Dr. Cramton shows that the [average] price

[21] Cramton Dec. ¶ 9.

[22] Cramton Dec. ¶ 22.

for "local" plans in the markets where Leap has entered fallen by an average of 37 percent.[23] And as one would expect, given lower prices, consumers enjoy a greater quantity of the service: wireless customers in markets where Leap provides service through the Cricket model provides service enjoy 41.5 percent more airtime minutes than in markets where it does not.[24]

In addition to what Dr. Cramton terms the "Leap effect," society benefits with each incremental addition of a "traditional" carrier. Dr. Cramton demonstrates that the prices of local and national calling plans are inversely correlated to the number of carriers offering such plans.[25] Nor does the trend of falling prices appear to be leveling off as the number of carriers overall increases.[26] And in some cases, the opposite is true: AT&T maintained the same price levels for its national "Digital One Rate" plan through the entry of the second, third and fourth competitors offering comparable service plans. AT&T only dropped its rates (by 14 to 22 percent) upon the entry of a fifth competitor offering a comparable "national" plan.[27] The incremental gains in consumer welfare from the entry of additional competitors do not diminish or disappear as the overall level of competitors rises. Indeed, as the AT&T national plan demonstrates, the opposite may be true.

By preventing incumbent carriers from foreclosing new entry through the acquisition of all of the CMRS spectrum in any one market, the spectrum cap makes such competition possible. Dr. Cramton also highlights several other public interest benefits to the rule. He notes that the spectrum cap encourages the efficient use of spectrum, as carriers are

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[23] Cramton Dec. ¶ 23.

[24] Cricket Communication Internal Research Memorandum (March 23, 2001).

[25] Cramton Dec. ¶ 27.

[26] *Id.*

[27] Cramton Dec. ¶ 29.

provided with the incentive to upgrade their networks with better technology to make use of the spectrum they are permitted to acquire.[28] And, counterintuitively, a cap may actually *increase* auction revenues by encouraging greater participation among new entrants.[29] Likewise, Dr. Cramton notes that the cap is the best available policy for achieving the diversity goals set forth in the Communications Act.[30] And because it provides *ex ante* certainty while maintaining the secrecy of bidding strategies, the cap is the *only* suitable response to potentially excessive concentration in an ascending auction.[31]

In sum, Dr. Cramton shows that by preventing incumbents from foreclosing competition, the spectrum cap:

- lowers prices to consumers,
- provides consumers with better service, and
- provides consumers with more diverse offerings better tailored to their needs.

The Commission should not abandon this policy.

C. Without the Cap, the CMRS Marketplace is Prone to Significant Reconsolidation.

If the Commission removes the spectrum cap, it may encourage incumbent carriers to foreclose new entry, and indeed, to reconsolidate. Without the spectrum cap, the public interest benefits just described could diminish or disappear.

The declaration of Dr. Cramton demonstrates that at current levels of competition, the entry or exit of a single carrier makes a significant change in the competitive landscape. That

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[28] Cramton Dec. ¶¶ 38-40.

[29] Cramton Dec. ¶¶ 41-42.

[30] Cramton Dec. ¶¶ 43-47.

[31] Cramton Dec. ¶¶ 35-37.

is, if incumbent carriers are able to reduce or foreclose competitive entry by even a single carrier, they will realize a greater supra competitive profit. For example, AT&T was forced by the entry of a *fifth* competitor (SBC) into the market for national "digital one-rate" plans to lower the price of its own plan by 14 to 22 percent.[32] Likewise, with respect to local plans, Professor Cramton demonstrates that the entry of each additional competitor has had a measurable downward effect on prices.[33] Plainly, incremental competition continues to produce measurable benefits to consumers, and the incremental reduction or foreclosure of market entry would deny consumers these benefits.

Because they can reap anticompetitive profits by reducing competition, the major incumbent carriers face perverse incentives to "squat" on spectrum, and/or to use it inefficiently. A carrier using inefficient analog equipment retains far more spectrum than it would need to meet the same demand using modern, spectrally-efficient equipment.[34] By doing so, the incumbent carrier profits in two ways: it saves money on equipment, and it reaps an supra competitive profit from the incremental foreclosure of competition.[35] The profit to be realized from spectrum "squatting" is particularly large among the old cellular carriers who retain a disproportionately large share of the CMRS market, and therefore would realize a disproportionately large share of the gain.[36]

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[32] Cramton Dec. ¶ 32.

[33] Cramton Dec. ¶¶ 33-34 .

[34] A complete discussion of this point appears in section III.B, *infra*, and in the Declaration of Mark Kelley attached to these Comments.

[35] *See* Cramton Dec. ¶ 49.

[36] *Id.*.

Even if a carrier does not deliberately *set out* to foreclose competition or otherwise to pursue anticompetitive profits, the availability of such profits would at very least stand as an attractive side effect of consolidation. And as the Commission has recognized, the CMRS marketplace is increasingly characterized by such consolidation. Five operators in the year-end 1998 "top 25" combined with other carriers in 1999, and as of the FCC's *Fifth Report* in August, 2000, another five operators in the year-end 1999 "top 25" had combined with other carriers.[37] And the trend continues.[38] Even if the CMRS marketplace were considered relatively competitive today, there are few checks in place to prevent the reconsolidation of this market. The CMRS marketplace is prone to consolidation in part because marginal costs (and thus fully competitive prices) are well below average variable costs so that, like railroads or oil refineries,[39] wireless carriers often rely on limitations on competition in order to recoup their substantial fixed costs. And because the finite amount of available spectrum poses an insurmountable barrier to entry, there is no natural curb on this tendency to consolidate.

The spectrum cap acts as a check on the outer bounds of such consolidation and competitive foreclosure. It is a "minimally intrusive,"[40] bright-line rule that ensures a certain minimum level of competition. It is *uniquely* able to assure such competition across *all* markets; and it is *uniquely* suited to preserving certain of the benefits of competition, including forcing

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[37] *See Fifth Report* at 10. A review of those commenters who have previously opposed the spectrum cap in some ways reads like a "Who's Who" of wireless consolidation. For example, Bell Atlantic, NYNEX, GTE and AirTouch, who all filed separate oppositions in the first spectrum cap proceeding, *see Third Report and Order* ¶ 242 n. 464, will now presumably file a consolidated opposition as Verizon.

[38] *See, e.g.*, Applications of TeleCorp PCS, Inc., et al., *Report and Order*, DA 00-2443 (WTB rel. Nov. 3, 2000).

[39] *Cf., generally, e.g.*, Ron Chernow, *Titan: The Life of John D. Rockefeller, Sr.* (1999) (describing Rockefeller's "stabilization" of otherwise extremely volatile oil prices by the elimination of competition).

[40] Third Report and Order ¶ 16.

carriers to use scarce spectrum resources efficiently.[41] As Dr. Cramton states, the spectrum cap is best viewed as a "well-priced insurance policy."[42] That policy should not now be allowed to expire.

D. The Amount of Spectrum Usable For CMRS Has Not Increased

The spectrum cap was designed to facilitate entry into CMRS by preventing the aggregation by relatively few carriers of large amounts of spectrum.[43] A policy that facilitates entry instills price discipline among existing competitors.[44] And in an emerging marketplace such as CMRS, it also ensures that development is not stagnated, for new and innovative services (such as Leap's Cricket service model) could not come to market without some avenue of entry remaining.[45] The spectrum cap cannot *create* avenues of entry of course, but it does facilitate entry by preventing incumbent carriers from acquiring excessive amounts of spectrum and thus *foreclosing* competition. Thus, the Commission has recognized that "a major purpose of the CMRS spectrum cap is to provide additional opportunities for potential new entrants . . . to secure spectrum rights and begin offering service."[46]

The FCC therefore established the spectrum cap based on how much *spectrum*, in total, was available.[47] That is, the cap was not based on how many competitors actually existed, or what market share they had, or what prices and service offerings they maintained. The only

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[41] *See* Section V, infra.

[42] Cramton Dec. ¶ 8.

[43] Cramton Dec. ¶ 16.

[44] Cramton Dec. ¶ 25.

[45] *Id.*

[46] *Notice* ¶ 5 (citing *1998 Biennial Review Order*, at ¶ 31).

[47] Cramton Dec. ¶ 16.

relevant considerations to the establishment and size of the spectrum cap were: (1) the determination that no more than one-fourth of all available spectrum should be held by a single entity, and (2) the total amount of spectrum available.[48] The FCC should not even *consider* raising spectrum cap therefore should not be increased unless and until it makes new spectrum available.[49]

Whatever can be said about competition in the marketplace for consumer CMRS products, there has been no increase since 1996 in the availability of CMRS spectrum. While some licenses were reclaimed by the FCC and reauctioned, the overall amount of CMRS spectrum available to all competitors has not increased.[50] One-fourth of the available spectrum in 1996 was 45 MHz, and one-fourth of the spectrum today is 45 MHz. No change has occurred that would justify a repeal or increase of the spectrum cap.

III. THE BIG CARRIERS' CLAIMS OF SPECTRUM "NEED" RING HOLLOW

The compelling reasons to retain the spectrum cap. And Leap submits there would be no real benefits from removing the cap – let alone any benefit of sufficient value to offset the benefits of retaining it. In this regard, the Commission wisely seeks comment on whether the spectrum cap does, or soon will, hinder carriers' ability to provide services to the public.[51]

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[48] *See 1996 R&O* ¶¶ 96-100.

[49] Moreover, any increase should be done only after the completion of a thorough and systematic review of *all* spectrum-related issues.

[50] The 700 MHz "Guard Band" cannot count for purposes of this or any other analysis as it is so heavily encumbered by interference, technical restrictions, and bizarre regulations seeking to enforce the "band manager" concept. And in any case, it does not count towards the spectrum cap.

[51] *See Notice* ¶ 33 (seeking comment on carriers' ability to migrate to "next generation" data services).

Indeed, throughout their many attempts to urge a repeal of the spectrum cap, the large wireless carriers have repeated their mantra that 45 MHz of CMRS spectrum in a market is somehow not enough spectrum.[52] Revealingly, these carriers *never* document their supposed needs. The truth of the matter is that carriers are not now capacity constrained, and any capacity constraints they do face can likely be remedied by adopting better technology. And to the extent that any carrier faces actual or imminent capacity constraints in a particular market, the Commission can remedy such a situation through judicious use of the waiver process. But as before, the large carriers' claims of capacity constraint ring hollow: The Commission observed in 1999 that "the current 45 MHz spectrum aggregation limit does not appear to be constraining carriers,"[53] and there is absolutely no evidence that this fact has changed.

A. Carriers are not capacity constrained

There is no indication that any wireless carrier is truly capacity constrained. If a business is faced with a shortage of an essential input for its product, one would expect that business to halt or at least to slow its marketing efforts, in recognition of the fact that its product will be in short supply. At the same time, one might also expect the business to raise prices to a level at which demand would not exceed the recently limited supply. But wireless carriers are meeting neither expectation. Instead, carriers continue to aggressively market the very services that they claim are constrained by the shortage of a key input.

Even as they claim capacity constraints, the large incumbent carriers continue to solicit more customers. A recent edition of the Washington Post had five advertisements for

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[52] *See, e.g., Auction # 35 Spectrum Cap Public Notice.*

[53] 1998 Biennial Regulatory Review Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd. 92919 ¶ 26 (1999).

wireless services.[54] And on the same day the New York Times had no fewer than two full page ads.[55] And in addition to soliciting more customers, they are soliciting greater *usage* by those customers of the allegedly capacity-constrained airwaves: Recent advertisements hawk larger and larger buckets of minutes, "free nights and weekends" promotions, and the like.[56] Indeed, the Commission has recognized that "operators have designed their pricing plans to increase subscribers' MOUs, not just total subscribership."[57]

Actions speak louder than words. As they solicit more customers, and encourage greater use of their networks, these carriers demonstrate that they in fact are not capacity constrained.

B. Carriers need efficiency, not more spectrum

When a firm faces scarcity, it can do one of two things: it can try to obtain more of whatever is scarce; or it can conserve and manage its existing resources, and make do with what it has. From a spectrum management perspective, many of the largest wireless carriers in the United States apparently have the first reaction. Rather than make efficient use of their existing spectrum holdings, they simply ask for more.

In his accompanying declaration, Mark C. Kelley, the Chief Technology Officer of Leap, demonstrates that technology is more important to the capacity of a wireless system than is the amount of spectrum it uses. The five principal wireless protocols now used in the United States are AMPS, the "first generation" analog technology, and four "second generation"

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[54] *See* The Washington Post (April 8, 2001), at A3 (Cingular Wireless), A19 (AT&T Wireless), A21 (Verizon Wireless), C3 (VMC Communications), F5 (VoiceStream Wireless).

[55] *See* The New York Times (April 8, 2001), at 17 (VoiceStream Wireless), 25 (AT&T Wireless).

[56] *See, e.g.,* Advertisement for Cingular Wireless, *The Washington Post* (April 8, 2001) at A3.

[57] *Fifth Report* at 22.

digital standards: CDMA, TDMA, GSM, and iDEN.[58] There are dramatic differences in the capacity of these various systems, and improvements are continually being made.

The differences are striking. The same call capacity that could be served using 16 MHz of spectrum on late-1990s CDMA equipment, would require 32 MHz of spectrum on mid-1990s CDMA equipment or on TDMA equipment, 78 MHz of spectrum on a GSM system, or a whopping 164 MHz of spectrum on an AMPS system.[59] In other words, a modern CDMA system can deliver the same capacity as a GSM system, using approximately *one-fifth* the spectrum.

Likewise, Mr. Kelley assesses the relative capabilities of the various technologies given the same amount of spectrum. As a unit of comparison, he uses Erlangs, a widely-used measure of system capacity.[60] Kelley finds that 10 MHz of spectrum produces 2.94 Erlangs of capacity on an AMPS system, 9.83 Erlangs on a GSM system, 24.60 Erlangs on a TDMA system, 36.00 Erlangs on a mid-'90s CDMA system, and 72.80 Erlangs on a late-'90s CDMA system.[61] In other words, a TDMA operator that switched to a modern CDMA system would instantly *double* its capacity.

With the notable exception of Sprint PCS, virtually every major carrier could at least double its system capacity just by improving the technology it uses. For example, AT&T predominantly uses TDMA, and reports that approximately 30 percent of its subscribers use AMPS. Even if AT&T upgraded *only* its AMPS capacity to the most efficient equipment now

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[58] Because it is used only by a single carrier, Nextel, these comments do not deal with the relative capacity of the iDEN system.

[59] *See* Kelley Dec. ¶ 27.

[60] One Erlang is equal to sixty minutes of use. Thus, an hour-long phone call from a single subscriber, or two minute calls from thirty subscribers would both equal one Erlang. *See* Kelley Dec. ¶ 20.

[61] *See* Kelley Dec. ¶ 24.

available (CDMA 95 A/E VRC), it would increase the capacity of that equipment by more than *24 times*, and its overall system capacity (based on 30% AMPS usage) would *more than double*.[62] And if AT&T upgraded its entire network, instead of merely the 30 percent that now remains analog, it would *more than triple* its network capacity.[63]

And so it goes for the other major opponents of the spectrum cap. Verizon, for example, reports that nearly fifty percent of its subscribers use analog technology![64] Indeed, Verizon continues to solicit new analog subscribers: its website continues to promote analog phones for use in major (allegedly "capacity constrained") urban markets.[65] And until very recently, Verizon aggressively promoted its analog services, with newspaper ads offering heavily-subsidized analog handsets and long-term analog service contracts.[66] Yet in the spectrum it takes to accommodate a *single minute* of analog use, Verizon could accommodate *24 minutes* of use on a more efficient network.[67]

Mark Kelley, who has worked with every major technology available, and who has designed hundreds of wireless networks around the world, points out the fundamental absurdity of some carriers' pleas of "capacity constraint," while they cling to inefficient and often outdated technologies. No carrier can seriously complain that it needs more spectrum, when the technology is available to increase its capacity by factors of two or more. As Kelley

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[62] *See* Kelley Dec. ¶ 24.

[63] *Id.*

[64] *Fifth Report* at 14.

[65] In the Washington, DC area, for example, Verizon currently promotes a service plan using the Audiovox MVX485 handset (an analog-only handset). *See* http://www.app.airtouch.com/ics/plsql/prepay.intro (website accessed April 12, 2000) (entering "20004" zipcode).

[66] *See* Bell Atlantic Mobile Advertisement, *The Washington Post* (June 25, 1999) page A3 (promoting minimum one-year service plan using Motorola Profile 300 analog-only handset for $9.99).

[67] See Kelley Dec. ¶ 24.

states: "Asking for more spectrum while you continue to use outdated, inefficient equipment is like, well, asking to have your cake and eat it too.",[68] they want to have their cake and eat it too.

C. Capacity constrained carriers can and should seek waivers

The spectrum cap was established as a bright-line rule designed in part to facilitate pro-competitive business combinations by providing certainty to the parties, and by accelerating the Commission's review of such combinations. As such, and as further discussed below, the cap serves a valuable purpose for all wireless operators. To abandon the cap would be to impose on *all* potential combinations the uncertainty and delay that attend a case-by-case review, rather than imposing these costs only on those parties whose combinations are likely to result in anticompetitive concentration of spectrum holdings.

The Commission has therefore recognized that the best solution to allegations that the public interest would be served by permitting combinations in excess of the spectrum cap is to allow parties to make this showing and obtain case-by-case waivers. Thus, "any party that believes that an individualized analysis is appropriate in its case may request a waiver."[69]

The Commission has articulated a general standard under which it will consider waivers of the CMRS spectrum cap: "[T]o the extent that a carrier can credibly demonstrate that in a particular geographic area the spectrum cap is currently having a significant adverse affect on its ability to provide 3G or other advanced services, [the Commission] will consider granting a waiver of the cap for that geographic area."[70] And while considering the potential benefits from allowing carriers to exceed the cap, the Commission "will also take into account any

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[68] Kelley Dec. ¶ 76.

[69] 1998 Biennial Regulatory Review Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd. 9219 ¶ 52 (1999) ("1998 Biennial Review Order").

[70] *Id.* ¶ 82

potential adverse affects of granting the waiver, such as diminution of competition."[71] A carrier may appropriately seek a waiver of the CMRS spectrum cap, then, if it demonstrates that (1) it has current need for additional spectrum in a specific market, and (2) grant of that waiver would have no significant anticompetitive effect in that market.

Despite the existence of this standard, and the availability of waivers, no carriers have demonstrated that they have any need for extra spectrum. Indeed, barely any carriers have even applied: research turns up only three waiver petitions that were filed over the five-year life of the spectrum cap.[72] And those carriers who applied failed utterly to show any circumstance that justified a waiver. For example, Cingular Wireless recently petitioned for a waiver of the spectrum cap.[73] But it failed to adduce any evidence whatsoever that it needs more spectrum, or that the public interest would otherwise be served by Cingular's possession of additional spectrum, or that Cingular's acquisition of additional spectrum would not lead to any anticompetitive effect.[74] The Commission has often been treated to generalizations and conclusory allegations, but despite the Commission's open invitation to do so, no carrier has ever shown a genuine need for additional spectrum. That is because they have no such need. No carrier has demonstrated that it needs to exceed the spectrum cap because, simply put, 45 MHz is plenty.

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[71] *Id.*

[72] *See Public Notice*, Wireless Telecommunications Bureau Seeks Comment on Cingular Wireless LLC's Request for Waiver, DA 01-665 (rel. March 14, 2001) ("Cingular Waiver Public Notice"); *see also Public Notice*, Wireless Telecommunications Bureau Seeks Comment on AT&T Wireless Services, Inc., BellSouth Corporation and Bell Atlantic Mobile, Inc. Petitions Regarding CMRS Spectrum Cap Limits, DA 00-318 (rel. Feb. 18, 2000); *see also* Letter from Kathleen Ham, FCC, to W. John Beasley, BellSouth Corporation, DA 96-1407 (rel. Aug. 29, 1996).

[73] *See Cingular Waiver Public Notice.*

[74] *See* Cingular Wireless, LLC, Request for Waiver of the CMRS Spectrum Aggregation Limit in Section 20.6(a) of the Commission's Rules (filed March 7, 2001). *See also* Opposition of Leap Wireless International, Inc. (filed April 3, 2001). It is also interesting to note that Cingular's request is for the Commission to waive the cap only by 1.5 MHz—an amount of spectrum that does not mesh with the supercarriers' alarmist claims of capacity constraint.

IV. ILL-DEFINED NOTIONS OF "3G" ARE NO REASON TO RAISE THE CAP

It is hard to shoot at a target that does not exist. So when carriers like Leap point out that the spectrum cap opponents need no more spectrum, they find refuge in rhetorical fog and vaporware. The spectrum cap opponents argue that they need extra spectrum in order to make way for some future services that have not yet been developed, or even defined, but are referred to collectively as "3G."

The Commission is therefore wise to seek "specific comment" on how the spectrum cap may affect the development of and migration to "next generation" services, including "mobile Internet and other data services."[75] In fact, the use of wireless devices for data transmission is unlikely to require vast amounts of bandwidth, and third generation technology will likely provide carriers with spectral efficiencies in their existing voice services that will offset any increased demand for bandwidth in data. And in any case, there is no reason the existing voice carriers should also dominate the nascent wireless data sector.

A. The Capacity Requirements of "3G" Are Vastly Overstated

Most data applications use surprisingly little bandwidth. A typical text message requires about 1,000 bits of data, compared to about 400,000 bits of data that is transmitted in a typical wireless phone call.[76] Even the heaviest users of text messaging send no more than five or ten messages an hour during peak periods.[77] Likewise, "wireless web" applications require very little bandwidth. A regular user – one who relied on his or her handheld device for news,

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[75] *Notice* ¶ 34.

[76] *See* Kelley Dec. ¶ 33.

[77] *Id.*

weather, movies, yellow pages and other functions – would still require for data less than a tenth of the bandwidth he required for voice telephony.[78]

ASCII characters require about 10 bits of data each.[79] Therefore any text-based data service, whether SMS, WAP, Email or some as-yet undeveloped "3G" text-based service, will require very, very little bandwidth.

More bandwidth may be required if wireless devices are used to download graphics, pictures, video clips and the like. For example, on the FCC homepage, the pictures of Chairman Powell and of the Portals (with the FCC logo) take up 46,816 and 89,888 bits, respectively.[80] And a typical 20-second video clip will take about 500,000 bits.[81] Graphics and media such as these examples are the most data-intensive applications available on the Internet, and still they would not pose a serious strain on existing system capacity: Even a 500,000 bit video clip would require little more bandwidth than an average (400,000 bit) phone call.

Nor is it clear that consumers will ever *want* to download graphics and watch video clips on their mobile phones or handheld devices. For example, one who needs to access the FCC Website while on the road might choose to forego the Portals photo, and opt instead for the equally-informative "text only" version.[82] And (particularly given the state of handheld screen technology) it seems unlikely that people will spend much time gazing at video images

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[78] *See* Kelley Dec. ¶ 34.

[79] Kelley Dec. ¶ 33.

[80] *See* http://www.fcc.gov/

[81] *See* Kelley Dec. ¶ 39.

[82] *See* http://www.fcc.gov/Welcometextonly.html.